Phytoplasmas associated with disease of coconut in Malaysia: Phylogenetic groups and host plant species

ABSTRACT

Coconut palm (Cocos nucifera), oil palm (Elaeis guineensis), Bermudagrass (Cynodon dactylon) and Madagascar periwinkle (Catharanthus roseus) with symptoms indicative of phytoplasma disease were collected from different locations in Malaysia. PCR assays employing phytoplasma universal rRNA gene primers P1/P7 alone or P1/P7 followed by R16F2n/R16R2 detected phytoplasmas in eight out of 20 Malayan Red Dwarf (MRD), nine out of 12 Malayan Yellow Dwarf (MYD) and 12 out of 12 Malayan Tall (MT) coconut palms displaying coconut yellow decline symptoms. Positive detections were also obtained from six out of six oil palm seedlings showing symptoms of yellowing and necrosis, from 10 out of 10 Bermudagrass samples with white leaf symptoms, and from eight out of eight periwinkle plants showing phyllody, virescence, little leaf, proliferation and foliar yellowing. Phytoplasmas were not detected in any of the symptomless plants tested. Sequencing and phylogenetic analysis of PCR products determined that phytoplasmas infecting both MRD and MT coconuts and Bermudagrass in Serdang, Selangor State, were all members of the 16SrXIV 'Candidatus Phytoplasma cynodontis' group, whereas isolates in periwinkle in Serdang were all members of the 16SrI 'Ca. Phytoplasma asteris' group. However, the phytoplasmas detected in MYD coconuts and oil palms from Banting, Selangor State, and in periwinkle from Putrajaya were collectively very similar (99%), but shared <97·5% similarity with 16S rDNA sequences of all other known phytoplasmas, indicating that they represent a novel taxonomic group. Thus, at least two phylogenetically distinct phytoplasmas are associated with the coconut yellow decline syndrome in Malaysia, both of which were also detected in other plant species.

Keyword: Bermudagrass, Cocos nucifera, Malaysia, Oilpalm, Periwinkle, Phytoplasma